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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/677,478	10/02/2000	Guy T. Blalock	M122-1544	4522

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WELLS ST. JOHN P.S.
601 W. FIRST AVENUE, SUITE 1300
SPOKANE, WA 99201

EXAMINER

VINH, LAN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 03/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/677,478

Applicant(s)

BLALOCK ET AL.

Examiner

Lan Vinh

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 6, 7, 10-13, 16-19, 21-28, 30, 32, 33, 36-42, 44, 46-48, 50 and 53-86 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21-28, 30, 32, 33, 58-61, 69-71, 82 and 86 is/are allowed.
- 6) ☒ Claim(s) 1-3, 6, 7, 10-13, 16-19, 36-42, 44, 46-48, 50, 53-57, 62-66, 72-77, 80, 81 and 83-85 is/are rejected.
- 7) ☒ Claim(s) 67, 68, 78 and 79 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 030604.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Applicant's argument, see the first paragraph on page 23 of the remarks, filed on 12/18/2003, with respect to the reference of Dahm et al (US 5,431,778) have been fully considered and are persuasive. However, applicant's argument with respect to the references of Hori et al (US 5,302,240), Barnes et al (US 5,505,816) and Westendorp et al (US 5,565,036) have also been fully considered and are unpersuasive. In addition, upon further consideration, a new ground of rejection is made in view of Mori et al (US 6,136,214). A discussion of the rejection follow.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3, 7, 62, 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hori et al (US 5,302,240) in view of Mori et al (US 6,136,214)

Hori discloses a method for manufacturing a semiconductor device by dry etching.

This method comprises the steps of:

dry etching a semiconductor wafer 1 having photoresist 4 formed thereon with a fluorocarbon gas (CHF₃ gas)/plasma etching material (col 11, lines 45-49), the gas forming a protecting film of CF on the sidewall of the film pattern on the semiconductor

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wafer (col 29, lines 36-38), which reads on the material forming a polymer comprising carbon and a halogen on the semiconductor wafer

after the etching step to form protecting film/polymer, etching the photoresist and protecting film/polymer film from the semiconductor wafer using CHF_3 gas/gas effective to etch polymer and photoresist from the wafer (col 31, lines 20-35, fig. 21B), after the contact hole is formed on the substrate, F (fluorine) left on the surface reacts with H (hydrogen) to form HF/hydrogen halide (col 20, lines 56-59), which reads on the gas having a hydrogen component effective to form gaseous hydrogen halide from halogen liberated from the polymer

the etching gas comprises CHF_3 /hydrogen component and oxygen, the ratio of the flow rate of CHF_3 gas to the flow rate of oxygen gas is 9:1 (col 32, lines 30-31) which reads on a volumetric ratio of approximately 0.1:1 of oxygen to CHF_3 /hydrogen component

Unlike the instant claimed invention as per claim 1, Hori does not specifically disclose forming the protecting film/polymer over at least some internal surfaces of a plasma chamber.

However, Mori, in a plasma processing method, discloses etching using fluorocarbon to form polymer which adheres to the inner wall of the chamber (col 1, lines 49-50)

Since Hori discloses the dry etching step using fluorocarbon in an etching chamber, one skilled in the art would have found it obvious that Hori's etching step would have formed a polymer over at least some inner wall/internal surface of Hori's etching chamber in view of Mori teaching because Mori states that when fluorocarbon gas

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plasma are used, carbon-based polymer adheres to the inner wall of the reaction chamber as the etching process proceeds (col 1, lines 50-51)

The limitations of claims 2-3 have been discussed above.

Regarding claim 7, Hori discloses using H_2 in the etching step (col 18, lines 56-57)

Regarding claim 62, since fig. 16 shows the etch rate of carbon film increases as the flow rate of oxygen increases, one skilled in the art would have found it obvious to adjust/increase the flow rate of oxygen by conducting routine experimentation in order to achieve increased etch rate.

Regarding claim 80, Hori discloses forming a silicon dioxide layer on the wafer (col 31, lines 6-7)

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hori et al (US 5,302,240) in view of Mori et al (US 6,136,214) and further in view of Barnes et al (US 5,505,816)

Hori as modified by Mori has been described above. Hori and Mori differ from the instant claimed invention as per claim 6 by using fluorocarbon as hydrogen component instead of ammonia.

However, Barnes, in a method of dry etching, discloses using a gas mixture comprises ammonia or fluorocarbon gas and oxygen (col 2, lines 20-22)

Hence, one skilled in the art would have found it obvious to substitute Hori and Mori fluorocarbon gas with ammonia gas in view of Barnes teaching because Barnes teaches that the creation of ammonia within the etch chamber provides for enhanced

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directional etching capabilities and results in improved anisotropic etching (col 2, lines 31-34)

5. Claims 10-13, 16-19, 81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hori et al (US 5,302,240) in view of Mori et al (US 6,136,214)

Hori discloses a method for manufacturing a semiconductor device by dry etching.

This method comprises the steps of:

dry etching a semiconductor wafer 1 having photoresist 4 formed thereon with a fluorocarbon gas (CHF gas)/plasma etching material (col 11, lines 45-49), the gas forming a protecting film of CF on the sidewall of the film pattern on the semiconductor wafer (col 29, lines 36-38), which reads on the material forming a polymer comprising carbon and a halogen on the semiconductor wafer

after the etching step to form protecting film/polymer, etching the photoresist and protecting film/polymer film from the semiconductor wafer using CHF₃ /carbon compound at a pressure of 10 mTorr /subatmospheric pressure, after the contact hole is formed on the substrate, F (fluorine) left on the surface reacts with H (hydrogen) to form COF (col 20, lines 56-59), which reads on the gas comprises a carbon compound effective to getter the halogen from the etched polymer

the etching gas comprises CHF₃/carbon compound and oxygen, the ratio of the flow rate of CHF₃ gas to the flow rate of oxygen gas is 9:1(col 32, lines 30-31) which reads on the carbon compound is provided at from about 5-80% by volume of the oxygen and carbon compound mixture.

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Unlike the instant claimed invention as per claim 10, Hori does not specifically disclose forming the protecting film/polymer over at least some internal surfaces of a plasma chamber.

However, Mori, in a plasma processing method, discloses etching using fluorocarbon to form polymer which adheres to the inner wall of the chamber (col 1, lines 49-50)

Since Hori discloses the dry etching step using fluorocarbon in an etching chamber, one skilled in the art would have found it obvious that Hori's etching step would have formed a polymer over at least some inner wall/internal surface of Hori's etching chamber in view of Mori teaching because Mori states that when fluorocarbon gas plasma are used, carbon-based polymer adheres to the inner wall of the reaction chamber as the etching process proceeds (col 1, lines 50-51)

Regarding claim 11, Hori discloses that after the contact hole is formed on the substrate, F (fluorine) left on the surface reacts with H (hydrogen) to form HF/hydrogen halide (col 20, lines 56-59)

The limitations of claims 12-13,19 have been discussed above.

Regarding claims 16-18, Hori discloses using CO (carbon monoxide) in the etching chamber (col 32, lines 43-44)

Regarding claim 81, Hori discloses forming a silicon dioxide layer on the wafer (col 31, lines 6-7)

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6. Claims 36-42, 44, 46, 72, 83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hori et al (US 5,302,240) in view of Mori et al (US 6,136,214) and further in view of Hong ((US 6,103,070)

Hori discloses a method for manufacturing a semiconductor device by dry etching.

This method comprises the steps of:

positioning a semiconductor wafer on a wafer receiver 22 in a plasma chamber (fig.2), the wafer having photoresist layer 4 formed thereon (fig.1A)

biasing the wafer receiver (col 34, lines 36-37)

dry etching a semiconductor wafer 1 through openings formed on the photoresist 4 with a fluorocarbon gas (CHF gas)/plasma etching material (col 11, lines 55-58), the gas forming a protecting film of CF on the sidewall of the film pattern on the semiconductor wafer (col 29, lines 36-38), which reads on the material forming a polymer comprising carbon and a halogen on the semiconductor wafer

after the etching step to form protecting film/polymer, etching the photoresist and protecting film/polymer film from the semiconductor wafer using etching gas comprises CHF_3 at a pressure of 10 mTorr /subatmospheric pressure (col 32, lines 28-33) , after the contact hole is formed on the substrate, F (fluorine) left on the surface reacts with H (hydrogen) to form COF (col 20, lines 56-59), which reads on the gas having one effective component to etch photoresist from the substrate and polymer and getter the halogen from the etched polymer to restrict further etching , the gas may include H_2 (col 13, lines 15-38)

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Unlike the instant claimed invention as per claim 36, Hori does not specifically disclose forming the protecting film/polymer over at least some internal surfaces of a plasma chamber and using negative bias to a range of 100-400 volts.

However, Mori, in a plasma processing method, discloses etching using fluorocarbon to form polymer which adheres to the inner wall of the chamber (col 1, lines 49-50)

Since Hori discloses the dry etching step using fluorocarbon in an etching chamber, one skilled in the art would have found it obvious that Hori's etching step would have formed a polymer over at least some inner wall/internal surface of Hori's etching chamber in view of Mori teaching because Mori states that when fluorocarbon gas plasma are used, carbon-based polymer adheres to the inner wall of the reaction chamber as the etching process proceeds (col 1, lines 50-51)

Hong, in a RF plasma etching method, teaches providing negative bias voltage in a range of 100 volts to the wafer receiver (col 10, lines 32-64)

Since Hori discloses biasing the wafer receiver in a RF plasma etching method, one skilled in the art would have found it obvious to modify Hori and Mori method by providing negative bias voltage to the wafer receiver as per Hong because Hong states that a pedestal bias voltage of -30 V DC is satisfactory but may range from -20 to -100 V (col 10, lines 62-64)

Regarding claims 37, 42, Hori discloses forming HF/hydrogen halide (col 20, lines 6-10)

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Regarding claims 38-39, Hori discloses the etching gas comprises CHF_3 /hydrogen component and oxygen, the ratio of the flow rate of CHF_3 gas to the flow rate of oxygen gas is 9:1 (col 32, lines 30-31) which reads on a volumetric ratio of approximately 0.1:1 of oxygen to CHF_3 /hydrogen component

The limitation of claim 41 has been discussed above in paragraph 4.

Regarding claim 44, Hori is silent about removing the wafer from the wafer receiver during etching, which reads on the first and second plasma etching are conducted in-situ.

Regarding claim 46, Hori discloses using CO/carbon compound (col 32, lines 43-44)

Regarding claim 83, Hori discloses forming a silicon dioxide layer on the wafer (col 31, lines 6-7)

7. Claims 47-48, 50, 53-57, 75-77, 84-85 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hori et al (US 5,302,240) in view of Mori et al (US 6,136,214) and further in view of Westendorp et al (US 5,565,036)

Hori discloses a method for manufacturing a semiconductor device by dry etching. This method comprises the steps of:

positioning a semiconductor wafer on a wafer receiver 22/electrostatic chuck that is connected to a power source 24 in a inductively coupled plasma chamber (fig.2), the wafer having a photoresist layer formed on an silicon oxide layer/insulative layer, the photoresist having contact opening patterns (fig.1A)

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dry etching a semiconductor wafer 1 through openings formed on the photoresist 4 to form opening within the silicon oxide/insulative layer with a fluorocarbon gas (CHF₃ gas)/plasma etching material (col 11, lines 55-60), the gas forming a protecting film of CF on the sidewall of the film pattern on the semiconductor wafer (col 29, lines 36-38), which reads on the material forming a polymer comprising carbon and a halogen on the semiconductor wafer

after the etching step to form protecting film/polymer, etching the photoresist and protecting film/polymer film from the semiconductor wafer using etching gas comprises CHF₃/hydrogen component/hydrocarbon and oxygen at a pressure of 10 mTorr /subatmospheric pressure at a bias potential/ground potential (col 32, lines 28-33, col 34, lines 36-37, fig. 2), after the contact hole is formed on the substrate, F (fluorine) left on the surface reacts with H (hydrogen) to form HF (col 20, lines 56-59), which reads on the gas having one effective component to etch photoresist from the substrate and polymer and getter the halogen from the etched polymer to restrict further etching of the material on the semiconductor wafer during etching

Unlike the instant claimed inventions as per claim 47, 54, Hori does not specifically disclose forming the protecting film/polymer over at least some internal surfaces of a plasma chamber. Regarding claim 47, Hori also does not disclose using the hydrogen component comprising hydrocarbon and ammonia

However, Mori, in a plasma processing method, discloses etching using fluorocarbon to form polymer which adheres to the inner wall of the chamber (col 1, lines 49-50)

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Since Hori discloses the dry etching step using fluorocarbon in an etching chamber, one skilled in the art would have found it obvious that Hori's etching step would have formed a polymer over at least some inner wall/internal surface of Hori's etching chamber in view of Mori teaching because Mori states that when fluorocarbon gas plasma are used, carbon-based polymer adheres to the inner wall of the reaction chamber as the etching process proceeds (col 1, lines 50-51)

Westendorp, in a method of igniting plasma, discloses that a mixture of hydrocarbon and ammonia is used in a plasma chamber (col 2, lines 50-60)

Hence, one skilled in the art would have found it obvious to modify Hori and Mori by using the hydrogen component comprising hydrocarbon and ammonia as per Westendorp because according to Westendorp, preferably the mixture of the gases is transformable into plasma and ignitable by a radiofrequency source that generate 60 MHz discharge (col 4, lines 35-37)

The limitations of claims 48, 55 have been discussed above.

Regarding claim 50, Hori discloses using H_2 in the etching step (col 18, lines 56-57)

Regarding claim 56, Hori discloses that after the contact hole is formed on the substrate, F (fluorine) left on the surface reacts with H (hydrogen) to form COF (col 20, lines 56-59)

Unlike the instant claimed invention as per claims 75-77, Hori and Mori do not disclose using the hydrogen component comprises of hydrogen and methane/
/hydrogen and nitrogen

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However, Westendorp, in a method of igniting plasma, discloses that a mixture of methane, hydrogen and nitrogen is used in a plasma chamber (col 4, lines 22-33)

Hence, one skilled in the art would have found it obvious to modify Hori and Mori by using the gas mixture as taught by Westendorp because Westendorp states that the improvements of his invention include a plurality of gases which operate in combination with one another as the ionization element (col 4, lines 20-22).

Regarding claim 77, since Hori discloses changing the process parameters such as flow rate, pressure and power to influence the etch rate (col 13, lines 16-31), one skilled in the art would have found it obvious to vary the flow rate of the gases by conducting routine experimentation in order to obtain desirable etch rate. Regarding claim 84, 85, Hori discloses forming a silicon dioxide layer on the wafer (col 31, lines 6-7)

8. Claims 63-66, 73, 74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hori et al (US 5,302,240) in view of Mori et al (US 6,136,214) and further in view of Westendorp et al (US 5,565,036)

Hori as modified by Mori has been described above. Unlike the instant claimed invention as per claims 63-65, 73, Hori and Mori do not disclose using the hydrogen component comprises of hydrogen and ammonia/ammonia and methane/ hydrogen, ammonia and methane/hydrogen and nitrogen

However, Westendorp, in a method of igniting plasma, discloses that a mixture of methane, hydrogen, ammonia and nitrogen is used in a plasma chamber (col 4, lines 22-33)

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Hence, Hence, one skilled in the art would have found it obvious to modify Hori and Mori by using the gas mixture as taught by Westendorp because Westendorp states that the gas mixture is transformable into plasma and the improvements of his invention include a plurality of gases which operate in combination with one another as the ionization element (col 4, lines 20-22).

Regarding claims 66, 74, since Hori discloses changing the process parameters such as flow rate, pressure and power to influence the etch rate (col 13, lines 16-31), one skilled in the art would have found it obvious to vary the flow rate of the gases by conducting routine experimentation in order to obtain desirable etch rate.

Allowable Subject Matter

9. Claims 67, 68, 78, 79 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Regarding claims 67, 68, 78, 79, no prior art of record discloses the step of plasma etching at subatmospheric pressure using a gas comprising a carbon component such as aldehyde/ ketone effective to getter the halogen from the etched polymer after the step of forming the polymer/ first plasma etching.

Claims 21-28, 30, 32, 33, 58, 59-61, 69-71, 82, 86 are allowed.

The following is an examiner's statement of reasons for allowance: Regarding claim 21, the cited prior art of record fails to disclose the step of after the first plasma

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etching and with the wafer on the wafer receiver, second plasma etching at subatmospheric pressure using a gas effective to etch polymer from the chamber internal surface and getter halogen liberated from the polymer to restrict further etching of the material on the semiconductor wafer during the second plasma etching, the gas comprising at least H₂ and NH₃. The closest prior art of Hori et al (US 5,302,240) discloses performing a second plasma using a gas comprising H₂ and CHF₃

Regarding claim 59, the cited prior art of record fails to disclose the step of second plasma etching at subatmospheric pressure using a gas comprise oxygen, a carbon component and NH₃ effective to etch photoresist from the substrate and polymer from the chamber wall. The closest cited prior art of Hori (US 5,302,240) discloses the step of second plasma etching at subatmospheric pressure using a gas comprise oxygen, CHF₃/ carbon component to etch photoresist from the substrate and polymer from the wafer.

Response to Arguments

10. Applicant's arguments filed 12/18/2003 with respect to the references of Hori et al (US 5,302,240), Barnes et al (US 5,505,816), Westendorp et al (US 5,565,036) and Hong (US 6,103,070) have been fully considered but they are not persuasive.

Applicants argue that the combination of art fails to teach a plurality of plasma etches because Hori fails to provide a second plasma etch to etch the polymer. This argument is unpersuasive because as discussed in col 29, lines 8-39 of Hori, Hori discloses performing a RIE using CF₄ to etch the pattern 214 resulting in the formation

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of polymer 216, Hori then discloses performing a RIE using CHF₃ to control the etching shape of the pattern 214 (col 31, lines 34-36 and the pattern 214 having polymer 216 as seen in fig. 21B of Hori). Thus, the examiner asserts that Hori discloses a plurality of plasma etches including a second plasma etch to etch the polymer.

The applicants also argue that the combination of Barnes to modify Hori does not exist because under MPEP & 2143.0 (8th edition) authority, simply because you can substitute one chemistry for another does not provide the motivation rationale to make the substitution or modification without the desirability to do so. However, the examiner notes that the substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution *Ex parte Novak* 16 USPQ 2d 2041 (BPAI 1989) ; *In re Mostovych* 144 USPQ 38 (CCPA 1964). Thus, the examiner asserts that the obviousness rejection based upon Hori, Mori and Barnes is proper.

In response to applicant's argument that there is no suggestion to combine the references of Hori and Westendorp because the examiner's motivational rationale has no relevance to the teaching of Hori, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, since Hori is directed to a plasma etching method and Westendorp discloses that the

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mixture of the gases (hydrogen and hydrocarbon) is transformable into plasma, one skilled in the art would have found it obvious to combine the teaching of Hori and Westendorp to produce the claimed invention.

In response to applicant's argument that there is no suggestion to combine the references of Hori and Hong to produce claim 36 because the motivation statement is completely devoid of any motivation to use the negative voltage teaching of Hong in Hori's method. The examiner disagrees since both Hori and Hong are concerned with RF plasma etching method and Hong states that a pedestal bias voltage of -30 V DC is satisfactory but may range from -20 to -100 V (col 10, lines 62-64) which encompasses the claimed range of negatively biasing of 100 - 400 v, one skilled in the art would have found it obvious to employ Hong's teaching of negative bias voltage ranges in Hori method to produce the invention as per claim 36.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAN VINH whose telephone number is 571 272-1471. The examiner can normally be reached on Monday-Friday 8:30 -6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton, can be reached on 571 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



LV

March 6, 2004